

CLAIMS

1. An organic electrolyte capacitor including a positive electrode, a negative electrode and an electrolyte capable of
5 transferring lithium ions,

wherein the positive electrode contains a substance capable of carrying lithium ions and/or anions reversibly as a positive electrode active material, the negative electrode contains a substance capable of carrying lithium ions
10 reversibly as a negative electrode active material, and

wherein the positive and negative electrodes include the positive or negative electrode active material layer on an electrode substrate that has a conductive layer made of a conductive material on an electrode current collector, which
15 has a through-hole that penetrates the front and rear surfaces, and the negative electrode electrochemically carries lithium.

2. The organic electrolyte capacitor according to claim 1,

wherein the electrode substrate is a three-layer laminate
20 including a first conductive layer that is made of a conductive material and has many through-holes on a surface of an imperforate metal foil and a second conductive layer that is made of a conductive material and has holes or no holes on the other surface of the imperforate metal foil, and has through-
25 holes in the imperforate metal foil, which are formed by

etching the laminate.

3. The organic electrolyte capacitor according to claim 1 or 2,

5 wherein over 80% of the through-holes of the current collectors are blocked with the conductive material.

4. The organic electrolyte capacitor according to any one of claims 1 to 3,

10 wherein the current collectors are made of either copper or aluminum as a main component.

5. The organic electrolyte capacitor according to any one of claims 1 to 4,

15 wherein the conductive layers are made of a conductive material containing a conducting agent and a non-aqueous binder, the positive electrode active material layer contains the positive electrode active material and an aqueous binder, and the negative electrode active material layer contains the
20 negative electrode active material and an aqueous binder.

6. The organic electrolyte capacitor according to any one of claims 1 to 5,

 wherein the electrolyte is an aprotic organic solvent
25 solution of a lithium salt.

7. The organic electrolyte capacitor according to any one of claims 1 to 6,

wherein the capacitance per unit weight of the negative
5 electrode active material is more than three times of the capacitance per unit weight of the positive electrode active material, and the weight of the positive electrode active material is larger than the weight of the negative electrode active material.

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8. The organic electrolyte capacitor according to any one of claims 1 to 7,

wherein the organic electrolyte capacitor is formed by winding an electrode pair having the positive and negative
15 electrodes.

9. The organic electrolyte capacitor according to any one of claims 1 to 7,

wherein the organic electrolyte capacitor is formed by
20 laminating electrode pairs having the positive and negative electrodes.

10. The organic electrolyte capacitor according to any one of claims 1 to 9,

25 wherein the negative electrode active material is a

thermally treated aromatic condensation polymer, and an insoluble and infusible base having a polyacene skeletal structure in which hydrogen/carbon atomic ratio is in the range of 0.50 to 0.05.

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11. The organic electrolyte capacitor according to any one of claims 1 to 10,

wherein the positive electrode active material is mesoporous carbon.

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12. The organic electrolyte capacitor according to any one of claims 1 to 11,

wherein the current collectors have a thickness of 10 to 39 μm and a porosity of 10 to 90%.

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13. The organic electrolyte capacitor according to any one of claims 1 to 12,

wherein thickness of the conductive layer on one surface of the positive electrode is in the range of 1 to 20 μm , the thickness of the positive electrode active material layer on one surface of the positive electrode is in the range of 50 to 175 μm , the total thickness of the positive electrode is in the range of 110 to 360 μm , the thickness of the conductive layer on one surface of the negative electrode is in the range of 1 to 20 μm , the thickness of the negative electrode active

material layer on one surface of the negative electrode is in the range of 5 to 100 μm , and the total thickness of the negative electrode is in the range of 40 to 210 μm .

- 5 14. An electric device having the organic electrolyte capacitor according to any one of claims 1 to 13.

- 15 15. An electrode substrate that is coated with an electrode material containing an electrode active material and a binder
10 to form electrodes, comprising:

a conductive layer made of a conductive material that is formed on at least one surface of a current collector having through-holes that penetrate front and rear surfaces.

- 15 16. A storage device including a positive electrode, a negative electrode, and an electrolyte capable of transferring lithium ions,

wherein the positive electrode contains a substance capable of carrying lithium ions and/or anions reversibly as a
20 positive electrode active material,

wherein the negative electrode contains a substance capable of carrying lithium ions reversibly as a negative electrode active material, and

wherein the positive and negative electrodes have
25 conductive layers made of conductive materials on current

collectors having through-holes that penetrate the front and rear surfaces, and have positive or negative electrode active material layer on the conductive layers.